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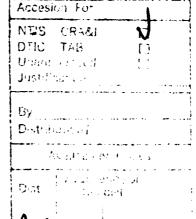
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OPTIMIZATION-BASED DESIGN OF CONTROL SYSTEMS

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Final Technical Report AFOSR Grant 86-0247 (July 31, 1986 — July 30, 1987)

> Elijah Polak Principal Investigators





Department of Electrical Engineering and Computer Sciences and the Electronics Research Laboratory University of California Berkeley, CA 94720

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FINAL REPORT FOR AFOSR EQUIPMENT GRANT No. 86-0247 (22521)

ABSTRACT (i) A DEC MicroVax II GPX Color workstation has been acquired for experimentation with the DELIGHT.MIMO interactive software system in the solution of optimal, worst case design of multivariable control systems. (ii) A SUN workstation - based system has been expanded for experiments in distributed computing for the optimal, integrated design of flexible structures and their control systems.

INTRODUCTION As part of our research on optimization-based design of multivariable control systems (sponsored by ONR) and on the optimization-based, integrated design of large space structures and their control systems (sponsored by AFOSR), we are carrying out research on the development of interactive software systems for the implementation of the design techniques we are producing. In particular, (i) we are developing DELIGHT.MIMO, an interactive computing system for the optimal, worst case design of multivariable control systems, and (ii) we are beginning to architect a distributed computing system, consisting of a work station for user-machine interaction and a large frame computer for system response simulation, for the design of flexible structures and their control systems.

SUMMARY OF EQUIPMENT USE

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- (i) The DEC MicroVax II GPX Color workstation is being used to implement DELIGHT.MIMO in an X-Windows environment.
- (i) The power and versatility of our fileserver-based SUN workstation system has been upgraded from SUN2 to SUN3 format and expanded by the addition of the following items:
- 1. One SUN 2 Upgrade, incl. 2/160-2 workstation & Floating Point Unit,
- 2. One SUN 3/140, 4MB workstation,
- 3. One SUN X511A "Shoebox" Disk/Tape Unit,
- 4. One Sun X960A Rack,
- 5. One Fujitsu Eagle Disk Drive,
- 6. One Apple Laserwriter Printer.

As a result of these additions, all the students and faculty participating in the project now have individual access to a workstations, which has considerably increased the productivity of our experimental work. Our skill in using workstations productively is also being considerable expanded, to the extent that plans for distributed computing, optimal design system experiments, involving flexible structures

and their control systems, are now beginning to be implemented, in collaboration with researchers at NASA Langley Research Center. Furthermore, the additions are enabling us to implement DELIGHT.MIMO in several several graphical environments, which increases its portability and ease of transferring it to industry.